



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Office of Chemical Safety and Pollution Prevention

MEMORANDUM

OPP OFFICIAL RECORD
 HEALTH EFFECTS DIVISION
 SCIENTIFIC DATA REVIEWS
 EPA SERIES 361

Date: February 17, 2011

Subject: **Sodium Cyanide and Hydrogen Cyanide:** Hydrogen Cyanide Residues in Citrus Resulting From Post-Harvest Fumigation.

PC Code: 074002 & 045801
 Decision No.: not applicable
 Petition No.: not applicable
 Risk Assessment Type: not applicable
 TXR No.: not applicable
 MRID No.: 47435701

DP Barcode: 353740
 Registration No.: not applicable
 Regulatory Action: not applicable
 Case No.: 3086
 CAS No.: 143-33-9
 40 CFR: 180.130

Reviewer: Thurston G. Morton, Chemist
 Risk Assessment Branch IV
 Health Effects Division (7509P)

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EXECUTIVE SUMMARY:

After fumigation with sodium cyanide at a rate of 1 oz NaCN/100 ft³, hydrogen cyanide residues in/on whole orange averaged 0.694 ppm. Hydrogen cyanide residues in whole lemons averaged 0.779 ppm. No storage stability data were submitted with the data package. Samples were stored approximately 2 months prior to analysis. Storage stability data are required.

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INTRODUCTION/BACKGROUND:

Washburn & Sons, Inc. has submitted data for hydrogen cyanide (HCN) residue in/on orange and lemon after fumigation with sodium cyanide (NaCN).

DISCUSSION:

Washburn & Sons, Inc. has submitted data hydrogen cyanide residue in/on orange and lemon after fumigation with sodium cyanide. (2008; MRID 47435701) titled:

Hydrogen Cyanide Residues in Citrus Resulting from Post-Harvest Fumigation.

Author: Robert I. Krieger, Ph.D.

Performing Laboratory: Personal Chemical Exposure Program, University of California, Riverside, CA

Project ID: UCR Study Number: HCN/1-08

Study Completion Date: May 12, 2008.

Citrus transport trailers were fumigated at a rate of 1 oz NaCN per 100 ft³ of trailer volume. Navel oranges and lemons were fumigated at Washburn & Sons, Inc. in Highgrove, CA which is the only operator of a trailer/truck citrus hydrogen cyanide fumigation facility for the protection of citrus against surface insects in California. Five trailers were used for fumigation. Unit 86 contained 5 samples of oranges and 4 samples of lemons. Unit 87 contained 5 samples of oranges and 3 samples of lemons. Unit 88 contained 5 samples of oranges. Unit 89 contained 3 samples of lemons. Unit 90 contained 5 samples of oranges. The trailers were fumigated in a closed system containing NaCN by addition of sulfuric acid to water at a rate of 1 oz NaCN/100 ft³. After one hour of fumigation the trailers were exhausted for approximately 30 minutes. At this point the doors of the trailers were sealed for transport to Arizona.

Oranges and lemons were sampled at the distribution center in Phoenix, AZ one day after fumigation. They were frozen and shipped to Microbac Laboratories, Inc. in Corona, CA. Samples were analyzed for hydrogen cyanide residues following Microbac Laboratories Standard Operating Procedure for EPA Method 335.2 modified for analysis of citrus. EPA Method 335.2 is applicable to drinking water and waste water. The registrant stated the method detection limit was 0.05 ppm. The analytical method was validated at three levels, 0.05 ppm, 0.13 ppm, and 0.2 ppm. Summary of the validation data is listed in Table 1. No storage stability data were submitted with the data package. Samples were stored approximately 2 months from sampling to analysis. A summary of HCN residues in/on whole oranges and lemons is listed in Table 2.

Table 1. Summary of Method Recovery Data for Hydrogen Cyanide in Orange.

Sample Matrix	Fortification Level (ppm)	% Recovery
Orange	0.05	95, 95, 79
	0.13	109, 95, 85
	0.20	89, 89, 79

Table 2. Summary of Hydrogen Cyanide Residues in Whole Orange and Whole Lemon after Fumigation with Sodium Cyanide at 1 oz/100 ft³. Citrus was fumigated in California and Sampled in Arizona the day after Fumigation.

Sample Matrix	Total HCN Residues (ppm)
Orange	0.59, 0.594, 1.08, 1.08, 0.765, 0.797, 0.449, 0.376, 0.874, 0.708, 0.415, 0.710, 0.872, 0.210, 1.32, 0.230, 0.863, 0.802, 0.358, 0.789
Lemon	1.24, 0.841, 0.511, 0.999, 0.838, 0.231, 0.137, 0.915, 0.834, 1.24

CONCLUSION:

After fumigation with sodium cyanide at a rate of 1 oz NaCN/100 ft³, hydrogen cyanide residues in/on whole orange averaged 0.694 ppm. Hydrogen cyanide residues in whole lemons averaged 0.779 ppm. No storage stability data were submitted with the data package. Samples were stored approximately 2 months prior to analysis. Storage stability data are required.

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RDI: SVH:2/17/11

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Chemical Name: Sodium cyanide
Hydrocyanic acid

PC Code: 074002

045801

HED File Code: 14000 Risk Reviews

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